have in vain searched for such a structure as is represented in the 'Algæ Britannicæ'; from a careful examination it appears that the fructification of this species is essentially the same as that which has been called acrospermal. It was remarked in a former communication that *Asperococcus* presents the basisperms and their accompanying simple filaments completely exposed; so of *Cutleria* it may be probably legitimate to say, that its fructification represents the acrospermal arrangement of a Fucus also placed on the surface, without any inflexion of the frond to form conceptacles. The accompanying figures represent the structure of the fruit in the genus alluded to. In this genus the asci and sporidia are exceedingly delicate and transparent: figs. 1, 2, 3 represent both; fig. 4, one of the latter separated.

XXII.—*On Microscopic Life in the Ocean at the South Pole, and at considerable depths.* By Prof. Ehrenberg*.

The following is the substance of a paper laid by Prof. Ehrenberg, May 23rd, 1844, before the Berlin Academy, and containing some of the results derived from his recent investigations upon materials furnished from the South Polar expedition of Captain Ross and the voyages of Messrs. Darwin and Schayer; their object being to determine the relation of minute organic life in the ocean, and at the greatest depths hitherto accessible.

Last year the author submitted to the Academy a survey of the geographical distribution of such organisms over the entire crust of the earth; but the field of these inquiries being one of such vast extent and importance, it became evident to him, that to arrive at any positive general results, it was necessary to examine the subject under a more special point of view, and under this conviction, two different courses of investigation suggested themselves as best adapted to fulfill that purpose; viz. first, to ascertain both the constant and periodical proportion which minute organisms bear to the surface of the ocean in different latitudes; and secondly, to examine submarine soil or sea-bottom raised from the greatest possible depths. It is an easy matter, generally, to collect materials of this kind; but before applying to them the test of philosophic criticism and research, the author feels that it is essentially requisite to retrace the contributions of other writers upon the same subject; premising, however, that their value will always be enhanced in so far as the materials collected have been obtained with due care and reference to their several localities.

* From the Proceedings of the Berlin Academy for May, and communicated by the Author.

I. *The South Polar Voyage from* 1841 *to* 1843.

Very essential progress was made in our knowledge of the minute and invisible forms of organic life during the years devoted to this expedition by Captain Ross. In the year 1840, the Royal Society of London appointed a committee to prepare a series of physical and meteorological questions to be solved by the proposed expedition; and it was at the express desire of the author that Alex. v. Humboldt undertook to suggest to that body the importance of attention being paid to the study of the relations under which minute organisms exist, as one likely to throw considerable light upon the principal questions now agitated, involved in the recent history of the earth's crust, and also to recommend that the directions given by the author as to the methods of collecting them should be adopted throughout the whole voyage. Through the scientific ardour of Dr. J. Hooker, son of the well-known botanist and a voyager on board the ship Erebus, a variety of valuable materials were collected during the expedition, and a short time back about forty packages and three glasses of water were transmitted to Germany from the neighbourhood of Cape Horn and Victoria Land. About the same time also, Mr. Darwin, the profound observer upon the formation of coral reefs in the South-seas, contributed objects from other localities.

The author set about examining carefully without delay, as such an opportunity might not again recur, water which had been taken from the South Polar sea of from 75° to 78° 10′ south latitude, and 162° west longitude, with a view of determining its relative amount of minute organic life. Of the dry materials some packets only have as yet been examined, those namely which from their localities appear to possess the greatest interest, and among these were specimens of the remains of melted polar ice and sea-bottom, taken under south latitudes 63° and 78°, from depths of 190 to 270 fathoms (*i. e.* 1140—1620 feet), the greatest depths that have been hitherto sounded.

The relations of minute organic life were found, as the author had anticipated, to be the same at the south as at the north pole, and generally of great extent and intensity at the greatest depths of the ocean.

Previous observations upon those loftiest mountains whose pinnacles are capped with eternal ice, had determined that a gradual progressive disappearance of organic life takes place from the base to their summit, and that too in accordance with particular laws; to the tree succeeding the lowly shrub, next grass and lichens, till finally we arrive at the regions of perpetual snow, where there is a complete absence of all life. In like manner the development of organized beings has been conceived to diminish from the equator to the arctic regions of the earth, the latter becoming first

destitute of trees, then of grass, lastly of lichens and algæ, until at the poles ice and death hold solemn reign.

The greatest depths in the ocean at which Mollusca had been found to exist were, according to the observations of Mr. Cuming in the year 1834, the genera *Venus, Cytherea* and *Venericardia* at 50, *Byssoarca* at 75, and *Terebratula* in 90 fathom water. According to Milne-Edwards and Elie de Beaumont, 244 metres, or 732 foot, formed the extreme range for the growth of corals and the development of organic matter in the sea off the coast of Barbary. From a 100-fathom depth, Péron drew up in the year 1800, off New Holland, *Sertulariæ* and a variety of corallines, which were all luminous, and on an average three degrees higher in temperature than the surface of the sea. In 1824 and 1825 Quoy and Gaimard, in their valuable researches upon the structure of corals, asserted that branched corallines could occur only in a depth of from 40 to 50 fathom, and that in a 100 fathom of water *Retepora* alone existed. According to Ellis and Mylius, who wrote in 1753, the greatest known depth from which a living animal had been taken was the *Umbellaria Encrinus,* which was fished up by Captain Adrian in Greenland from 236 fathom of water, equal to a depth of 1416 foot. Specimens, however, of the sea-bottom have been drawn up from still greater depths; for at Gibraltar, Captain Smith found in 950 fathom, or 5700 foot of water, sand containing fragments of shells; and Captain Vidal, according to Mr. Lyell, detected in the mud of Galway Firth, from a depth of 240 fathom, only some *Dentalia,* the remainder of the sea-bottom from the same depth consisting of pulverized shells and other organic remains devoid of life.

According to the calculations of Parrot, a column of sea-water at a depth of 1500 foot exercises a pressure of 750 pound, or $7\frac{1}{2}$ hundredweight, upon the square inch; and since the atmospheric air inclosed in these animals of a delicate cellular structure descending from the surface of the ocean would produce alternately such extremes of expansion and contraction as to appear destructive to such organisms, just doubts have been raised whether organic life could actually subsist at great depths.

Wollaston, moreover, in 1840 proved that at the great depth of 670 fathom, in the Mediterranean Sea off Gibraltar, the proportion of salt in the water was four times greater than at the surface. Very accurate and scientific investigations upon the amount of salts of the sea had been already published by Lenz in Petersburg during 1830; and Mr. Lyell, in his 'Geology' of 1840, was induced to regard the observations of Wollaston not as simply indicating a local phænomenon, but to conclude that at still greater depths the relative proportion of saline matter would be still more remarkable, and must progress in a similar advancing ratio.

Lastly, Elie de Beaumont, in 1841, adopted the opinion, that the limits to which the waters of the sea had been found by Siau capable of being set in motion, must be also those at which sessile marine animals could exist, since these have to wait for their food, which in this way only could be conveyed to them, and that consequently the limits of stationary organic life, taken in conjunction with the depth of the waves, could not much exceed 200 metres or 600 foot.

Such considerations, deeply affecting the general science of geology, and to which must be added observations upon the increase of temperature towards the centre of the earth, have ever suggested as an interesting matter for inquiry to the author, to examine minute organic life in relation to the depth of the element in which it could exist.

Science indeed owes a great debt of gratitude to those travellers who have so industriously provided the materials of this investigation; in respect of which materials it may be observed generally, that they are very rich in quite new typical forms, particularly in genera, of which some contain several species; these, occasionally with some mud and fragments of small crustaceans, form the chief part of the mass. The new genera* and species are here recorded, and of these the *Asteromphali* are very remarkable, from their particularly beautiful stellate forms.

Analysis of the various materials furnished by Dr. Hooker from the South Polar Voyage.

1. Residue from some melted Pancake Ice† at the barrier in 78° 10′ S. lat., 162° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Actinoptychus biternarius.*
2. Asteromphalus *Hookerii.*
3. — *Rossii.*
4. — *Buchii.*
5. — *Beaumontii.*
6. — *Humboldtii.*
7. — *Cuvierii.*
8. *Coscinodiscus actinochilus.*
9. — *Apollinis.*
10. — *cingulatus.*
11. — eccentricus.
12. — *gemmifer.*
13. — limbatus.
14. — lineatus.
15. *Coscinodiscus Lunæ.*
16. — Oculus Iridis.
17. — radiolatus.
18. — subtilis.
19. — velatus.
20. *Dicladia antennata.*
21. — *bulbosa.*
22. *Dictyocha* aculeata.
23. — Binoculus.
24. — *biternaria.*
25. — Epiodon.
26. — *octonaria.*
27. — Ornamentum.
28. — septenaria.

* Of the 7 new genera of Polygastrica, viz. *Anaulus*, *Asteromphalus*, *Chætoceros*, *Halionyx*, *Hemiaulus*, *Hemizoster*, and *Triaulacias*, short characters are given in the Proceedings of the Academy: also of the 71 new species.

† Thin and level fragments of ice found floating in the ocean.

29. *Dictyocha* Speculum.
30. *Flustrella* concentrica.
31. *Fragilaria* acuta.
32. — Amphiceros.
33. *Gallionella pileata.*
34. — sulcata?
35. Halionyx *senarius.*
36. — *duodenarius.*
37. Hemiaulus *antarcticus.*
38. Hemizoster *tubulosus.*
39. *Lithobotrys denticulata.*
40. *Lithocampe australis.*
41. *Pyxidicula dentata.*
42. — hellenica.
43. *Rhizosolenia Calyptra.*
44. — *Ornithoglossa.*
45. *Symbolophora Microtrias.*
46. — *Tetras.*
47. — *Pentas.*
48. — *Hexas.*
49. *Synedra* Ulna?
50. *Triceratium Pileolus.*
51. *Zygoceros australis.*

B. SILICEOUS PHYTOLITHARIA.

52. *Amphidiscus* Agaricus.
53. — clavatus.
54. — *Helvella.*
55. *Lithasteriscus bulbosus.*
56. *Spongolithis* acicularis.
57. — aspera.
58. — *brachiata.*
59. — Caput serpentis.
60. — cenocephala.
61. — Clavus.
62. — collaris.
63. — Fustis.
64. *Spongolithis Heteroconus.*
65. — inflexa.
66. — *Leptostauron.*
67. — mesogongyla.
68. — neptunia.
69. — *radiata.*
70. — trachelotyla.
71. — *Trachystauron.*
72. — *Trianchora.*
73. — *vaginata.*
74. — verticillata.
75. — uncinata.

C. CALCAREOUS POLYTHALAMIA.

76. *Grammostomum divergens.*
77. *Rotalia antarctica.*
78. *Rotalia Erebi.*
79. *Spiroloculina* —?

In several forms of the genus *Coscinodiscus* their green ovaries were recognizable, consequently they must have been alive.

2. Residue from melted ice, while the ship sailed through a broad tract of brown pancake ice, in 74° to 78° south latitude. (Materials from 75° S. lat., 170° W. long.)

A. SILICEOUS POLYGASTRICA.

1. Asteromphalus *Buchii.*
2. — *Rossii.*
3. *Coscinodiscus* lineatus.
4. — *Lunæ.*
5. — Oculus Iridis.
6. — radiolatus.
7. — subtilis.
8. *Dictyocha* aculeata.
9. *Eunotia* gibberula.
10. *Fragilaria* acuta.
11. — *pinnulata.*
12. — rotundata.
13. Hemiaulus *antarcticus.*
14. Hemizoster *tubulosus.*

B. SILICEOUS PHYTOLITHARIA.

15. *Spongolithis Fustis?* Fragm.

These and the former specimens were sent over in bottles of water. They were the same sealed bottles in which they were collected in the year 1842. In the first little bottle, in which the sediment was considerable, almost every atom being a distinct sili-

ceous organism, *Hemiaulus antarcticus* predominated. The larger bottle of the second mass had allowed the greater part to leak through the sealed cork, so that only about a quarter remained. The mass of sediment arrived in Berlin in May 1844, almost all in such a condition, that the author had no hesitation in considering them still alive, although they all belonged to the almost or perfectly motionless forms. The Fragilarias predominated (*F. pinnulata*); these, though rarely adherent in chains, had their green ovaries mostly preserved in a distinct natural disposition: *Coscinodisci* and *Hemiaulus* also often exhibited groups of green granules in their interior. No movement.

The following numbers were sent over dried:—

3. Sea-bottom drawn up by the lead from 190 fathom depth, in 78° 10′ S. lat., 162° W. long.

A. SILICEOUS POLYGASTRICA.

1. Asteromphalus *Hookerii.*
2. — *Buchii.*
3. — *Humboldtii.*
4. — *Cuvierii.*
5. *Coscinodiscus Apollinis.*
6. — *gemmifer.*
7. — limbatus.
8. — lineatus.
9. — *Lunæ.*
10. — radiolatus.
11. *Dictyocha septenaria.*
12. — Speculum.
13. *Fragilaria* Amphiceros.
14. *Fragilaria* al. sp.
15. *Gallionella Sol.*
16. Hemiaulus *antarcticus.*
17. *Lithobotrys denticulata.*
18. *Mesocena Spongolithis.*
19. *Pyxidicula.*
20. *Rhizosolenia Ornithoglossa.*
21. *Symbolophora? Microtrias.*
22. — *Tetras.*
23. — *Pentas.*
24. — *Hexas.*
25. Triaulacias *triquetra.*
26. *Triceratium Pileolus.*

B. SILICEOUS PHYTOLITHARIA.

27. *Amphidiscus Polydiscus.*
28. *Spongolithis* acicularis.
29. — aspera.
30. — *brachiata.*
31. — Caput serpentis.
32. — cenocephala.
33. — *Clavus.*
34. *Spongolithis* Fustis.
35. — neptunia.
36. — *Pes Mantidis.*
37. — *Trianchora.*
38. — *vaginata.*
39. — uncinata.

4. From snow and ice taken from the sea in 76° S. lat., 165° W. long., near Victoria Land.

SILICEOUS POLYGASTRICA.

1. *Coscinodiscus* lineatus.
2. — *Lunæ.*
3. — subtilis.
4. *Fragilaria pinnulata.*
5. — rotundata.
6. — al. sp.

The chief mass was densely crowded with *Fragilaria pinnulata* and with *Coscinodiscus*, which on softening in water generally exhibited their green ovaries, perhaps originally brown.

5. Contents of the stomach of a Salpa, 66° S. lat., 157° W. long. 1842.

SILICEOUS POLYGASTRICA.

1. *Actiniscus Lancearius.*
2. *Coscinodiscus Apollinis.*
3. — *cingulatus.*
4. — *gemmifer.*
5. — lineatus.
6. — *Lunæ.*
7. — subtilis.
8. *Dictyocha* aculeata.
9. — Speculum.
10. *Fragilaria* acuta.
11. — *granulata.*
12. — rotundata.
13. Halionyx *duodenarias.*
14. *Pyxidicula.*

This material contained a large number of *Dictyochas*, which evidently must have been particularly sought for by the Salpa, since they do not occur in the other samples, and consequently appear to be a favourite food of the Salpa.

6. Flakes floating on the surface of the ocean in 64° S. lat., 160° W. long.

They are like the *Oscillatoriæ* of our waters, matted with delicate fibres and with granules interspersed through the mass. The chief substance is formed of siliceous, very delicate, lateral tubes of the quite new and peculiar genus *Chætoceros*. The nature of the granules remains doubtful. The other forms are scattered through this matted substance; all exhibit however their dried-up ovaries, and consequently were collected alive.

SILICEOUS POLYGASTRICA.

1. Asteromphalus *Darwinii.*
2. — *Hookerii.*
3. — *Rossii.*
4. — *Buchii.*
5. — *Humboldtii.*
6. Chætoceros *Dichæta.*
7. — *Tetrachæta.*
8. *Coscinodiscus* lineatus.
9. — subtilis.
10. *Dictyocha* aculeata.
11. — Binoculus.
12. — Ornamentum.
13. — Speculum.
14. *Fragilaria* Amphiceros.
15. — *granulata.*
16. Hemiaulus *obtusus.*
17. *Lithobotrys denticulata.*

7. The mass brought up by the lead from the bottom of the sea in the Gulf of Erebus and Terror, at the depth of 207 fathoms, in 63° 40′ S. lat., 55° W. long.

The following species, occasionally with distinct green ovaries, were found in this very small sample, mixed among the apparently unorganic sand.

A. SILICEOUS POLYGASTRICA.

1. Anaulus *scalaris.*
2. *Biddulphia ursina.*
3. *Coscinodiscus Apollinis.*
4. — *cingulatus.*
5. *Coscinodiscus Lunæ.*
6. — subtilis.
7. — velatus.
8. *Fragilaria* rotundata.

9. *Gallionella Sol.*
10. — *Tympanum.*
11. *Grammatophora* parallela.
12. Hemiaulus *antarcticus.*
13. *Rhaphoneïs fasciolata.*
14. *Zygoceros*? *australis.*

B. SILICEOUS PHYTOLITHARIA.

15. *Spongolithis* acicularis.
16. *Spongolithis* Fustis.

8. Sea-bottom drawn up by the lead from 270 fathom, in 63° 40′ S. lat., 55° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Achnanthes* turgens.
2. *Amphora* libyca.
3. Anaulus *scalaris.*
4. *Biddulphia ursina.*
5. *Campylodiscus* Clypeus.
6. *Coscinodiscus Apollinis.*
7. — *gemmifer.*
8. — lineatus.
9. — *Lunæ.*
10. — Oculus Iridis.
11. — radiolatus.
12. — subtilis.
13. *Denticella lævis.*
14. *Discoplea Rota.*
15. — *Rotula.*
16. *Flustrella* concentrica.
17. *Fragilaria* Amphiceros.
18. — *pinnulata.*
19. *Gallionella Oculus.*
20. — *Sol.*
21. *Gallionella* sulcata.
22. *Grammatophora* africana.
23. — parallela.
24. — *serpentina.*
25. Hemiaulus *antarcticus.*
26. *Lithocampe* n. sp.
27. *Mesocena Spongolithis.*
28. *Navicula elliptica.*
29. *Podosphenia* cuneata.
30. *Pyxidicula* hellenica?
31. *Rhaphoneïs fasciolata.*
32. *Rhizosolenia Calyptra.*
33. — *Ornithoglossa.*
34. *Stauroptera* aspera.
35. *Symbolophora Microtrias.*
36. — *Tetras.*
37. — *Pentas.*
38. — *Hexas.*
39. *Synedra* Ulna.

B. SILICEOUS PHYTOLITHARIA.

40. *Amphidiscus* clavatus.
41. *Spongolithis* acicularis.
42. — aspera.
43. — *brachiata.*
44. — Caput serpentis.
45. — Clavus.
46. — Fustis.
47. *Spongolithis Heteroconus.*
48. — *ingens.*
49. — neptunia.
50. — obtusa.
51. — *vaginata.*
52. — uncinata.

C. CALCAREOUS POLYTHALAMIA.

53. *Grammostomum divergens.*

9. Samples from Cockburn's Island, the furthest limit of vegetation at the South Pole, 64° 12′ S. lat., 57° W. long.

Off Cockburn's Island (Cockburn's Head) Dr. Hooker saw an Alga, as the lowest and furthest step of vegetation, with forms of *Protococcus.* The Alga is one of the *Tetraspora* allied to *Ulva,* which Dr. Hooker has reserved in order to describe more accurately: I have not recognised the *Protococcus* in its dried condition. This mass, however, is chiefly and equally peopled with and made up of Siliceous Polygastrica. An apparently unorganic

sand, penguins' feathers and excrements, the *Ulva*, and only five as yet distinguished species of siliceous Infusoria in great numbers, form the mass sent over. The vegetable substances may indeed have disappeared by putrefaction. The excrement of the birds, like guano, might abundantly furnish solid matter; but the solid siliceous earthy element of the little invisible polygastric animals appears to form no inconsiderable part of the solid substance, which by the death of generations goes to form earth and land.

The following forms were observed:—

SILICEOUS POLYGASTRICA.

1. *Eunotia* amphioxys.
2. *Pinnularia* borealis.
3. — peregrina?
4. *Rhaphoneis Scutellum.*
5. *Stauroptera capitata.*

Two forms are new, two have been observed also at the north pole, and one is widely distributed.

II. *Oceanic materials from M. Schayer.*

M. Schayer of Berlin, who for fifteen years was superintendent of English sheep-folds at Woolnorth in Van Diemen's Land, has, in answer to a request sent to him in the year 1842 by the author, collected materials unquestionably rich in microscopic animals; he also collected water taken from the ocean in different regions on his return in 1843, and brought with him to Berlin four bottles holding from a quarter to half a pint. The author had wished that water had been drawn up at a distance from the coast in accurately known places, in order to become acquainted in some measure with the usual amount of microscopic life of the ocean.

The four well-preserved sealed bottles which have arrived in Berlin were shown to the Academy by the author, and the water is still quite clear and transparent, having only a few flakes at the bottom, which render it turbid when shaken, but soon subside again to the bottom, and the former transparency is restored. When opened, a slight but yet evident trace of sulphuretted hydrogen was perceptible.

The microscopic investigation has given the following results:

1. Water from the south of Cape Horn on the high sea under 57° S. lat., 70° W. long., contained—

SILICEOUS POLYGASTRICA.

1. *Fragilaria granulata.*
2. Hemiaulus *obtusus.*
3. *Lithostylidium* Serra.

2. Water from the region of the Brazilian coast near Rio de Janeiro on the high sea, in 23° S. lat., 28° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Cocconeïs* Scutellum.
2. *Fragilaria* Navicula.
3. *Gallionella* sulcata.
4. *Haliomma* radiatum.
5. *Navicula* dirhynchus.
6. *Navicula* Scalprum.
7. *Pinnularia oceanica.*
8. — peregrina.
9. *Surirella* sigmoidea.
10. *Synedra* Ulna.

B. SILICEOUS PHYTOLITHARIA.

11. *Spongolithis* aspera.
12. — cenocephala.
13. *Spongolithis* Fustis.
14. — *vaginata.*

3. Water from the equatorial ocean in the direction of St. Louis in Brazil, in 0° lat., 28° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Fragilaria* rhabdosoma.
2. *Fragilaria* Navicula.

B. SILICEOUS PHYTOLITHARIA.

3. *Lithostylidium* rude.
4. *Lithostylidium* Serra.

4. Water from the Antilles Ocean, 24° N. lat., 40° W. long.

A. SILICEOUS POLYGASTRICA.

1. *Haliomma* radiatum.

B. SILICEOUS PHYTOLITHARIA.

2. *Lithodontium* nasutum.
3. *Lithostylidium* Amphiodon.
4. *Lithostylidium* rude.

C. MEMBRANOUS PORTIONS OF PLANTS.

5. *Pollen* Pini.

It follows from these four series of observations obtained through M. Schayer, that the ocean, in its usual condition, without peculiarity of colour, without storms and other influences, contains, in the most transparent sea-water, numerous perfect and wholly invisible organisms suspended in it, and that the siliceous-shelled species are the most predominant in all those cases, although the analysis of sea-water does not show silica as a constant ingredient.

III. *On a Cloud of Dust which rendered the whole air hazy for a long time on the high Atlantic Ocean in* 17° 43′ *N. lat.,* 26° *W. long., and its being constituted of numerous siliceous animalcules.*

Mr. Darwin, the well-known and most meritorious English traveller and writer on coral reefs, relates in the account of his travels, that a fine dust constantly fell from the hazy atmo-

sphere off the Cape Verd Islands, and also on the high sea of that region, while he was there; and likewise on a ship, which, according to the account in his letter, was 380 sea-miles distant from land. The wind was then blowing from the African coast. Mr. Darwin has sent to the author for examination a sample of the dust which fell on the ship on the high sea at that great distance from land. This dust has been universally regarded hitherto as volcanic ashes. The microscopic analysis has clearly shown that a considerable portion, perhaps one-sixth of the mass, consists of numerous species of Siliceous Polygastrica and portions of silicated terrestrial plants, as follows :—

A. SILICEOUS POLYGASTRICA.

1. *Campylodiscus* Clypeus.
2. *Eunotia* Amphioxys.
3. — gibberula.
4. *Gallionella* crenata.
5. — distans.
6. — granulata.
7. — marchica.
8. — procera.
9. *Gomphonema* rotundatum ?
10. *Himantidium* Arcus.
11. — Papilio.
12. *Navicula* affinis ?
13. — lineolata.
14. — Semen.
15. *Pinnularia* borealis.
16. — gibba.
17. *Surirella* (peruviana ?).
18. *Synedra* Ulna.

B. SILICEOUS PHYTOLITHARIA.

19. *Amphidiscus* Clavus.
20. *Lithodontium* Bursa.
21. — curvatum.
22. — furcatum.
23. — nasutum.
24. — truncatum.
25. *Lithostylidium* Amphiodon.
26. — *clavatum*.
27. — cornutum.
28. — læve.
29. *Lithostylidium* Ossiculum.
30. — quadratum.
31. — rude.
32. — Serra.
33. — *spiriferum*.
34. *Spongolithis* acicularis.
35. — aspera.
36. — mesogongyla.
37. — obtusa.

The forms included in this catalogue, mostly known and for the most part European, prove—

1. That this meteoric shower of dust was of terrestrial origin.
2. That it was not volcanic ash.
3. That it was dust which had been lifted up to a great height from a dried-up marshy district by an unusually strong current of air or a whirlwind.
4. That the dust did not necessarily and evidently come from Africa, as being the nearest land, although the wind blew from thence when the dust fell; for this reason, that no exclusively African forms are among it.
5. That as *Himantidium Papilio*, a very marked form, has hitherto occurred only in Cayenne (see the Mikroskopische Leben in Süd- und Nord-Amerika, plate 2. fig. 2.), and as the *Surirella* is also probably an American form, only two conclusions present themselves; either that the dust was raised in South America into

the upper strata of air, and brought by a change of the current in another direction, or *Himantidium Papilio*, together with *Surirella*, likewise occur elsewhere, namely in Africa.

Review of the Results of these Investigations.

1. Not only is there, as resulted from the former observations of the author (vide d. Mikroskopische Leben in Amerika, Spitzbergen, &c.), an invisible minute creation in the neighbourhood of the Pole, where the larger animals can no longer subsist, but a similar creation is highly developed at the South Pole.

2. Even the ice and snow of the South Polar Sea is rich in living organisms, contending successfully with the extremity of cold.

3. The microscopic living forms of the South Polar Sea contain great riches hitherto wholly unknown, frequently of very elegant shape, since no less than seven peculiar genera have been discovered, of which some contain several, one as many as seven species.

4. The forms collected in the year 1842, near Victoria Land, were capable of being examined in an almost fresh state in Berlin in May 1844, which shows how long preservation is possible.

5. The ocean is not only populated at certain localities, and in inland seas or on the coasts, with invisible living atoms, but is proportionately thickly crowded with life everywhere in the clearest state of the sea-water and far from the coasts.

6. Hitherto but one perfectly microscopic form from the high sea was known, and even that from the neighbourhood of the coast, namely the *Astasia oceanica*, which Von Chamisso had observed; all other accounts were imperfect and useless. By the new materials the number of species is increased nearly 100.

7. The hitherto observed oceanic microscopic forms are chiefly siliceous-loricated animals with some calcareous-shelled. Do these numerous forms derive the material of their shells from the bottom of the sea? This question becomes daily more interesting.

8. Siliceous- and calcareous-shelled minute living forms are not only mixed up with the muddy sea-bottom, but they themselves form it. They live even to a depth of 270 fathom, and consequently support a pressure of water equal to 50 atmospheres; the whole influence of this does not indeed bear upon their organic tissues when they are locally fixed, but when they move from the bottom upwards or reversely; yet it does not appear to have acted on the drawn up specimens. Who can doubt but that organic beings which can support a weight of 50 atmospheres may support 100 and more?

9. The supposition, that in great depths, above 100 fathom,

there is no fresh nutriment for organized beings of any kind, has become untenable.

10. Life and temperature in the depths of the ocean are, in their variable relation, the points which at present deserve especial attention.

11. The showers of meteoric dust, or supposed ashes, have at present been proved to be, even in the case where they fell 380 sea-miles from land, of organic and terrestrial origin.

12. It is not perishable *Protococci* or *Ulvæ* or Lichens that principally constitutes the organic covering and soil of the ultimate islands in the Polar Sea; but the living creatures that form the first layer of solid earth are invisible, minute, free animals of the genera *Pinnularia, Eunotia* and *Stauroneïs* with their siliceous loricæ. Several species from the North Pole and the South Pole are identical.

XXIII.—*Descriptions of some British* Chalcidites. By Francis Walker, Esq., F.L.S.

Callimome Rasaces, Fem. *Cupreus purpureo varius, metathorace viridi, abdomine cyaneo basi rufo, antennis nigris, pedibus fulvis, alis subfuscis.* (Corp. long. lin. 2; alar. lin. 3.)

Body convex: head and thorax cupreous, tinged with purple, covered with minute scales disposed in little transverse striæ: head short, transverse, a little broader than the thorax: antennæ subclavate, black, as long as the thorax; first joint fulvous, long, stout, linear, black towards the tip; second cyathiform; third and fourth very minute; fifth and following joints to the club successively decreasing in length; club long-conical, acuminate, much more than twice the length of the eleventh joint: thorax elliptical, punctured sparingly and irregularly: prothorax large, subquadrate; its breadth exceeding its length; rounded on each side in front: scutum of the mesothorax large, its breadth slightly exceeding its length; sutures of the parapsides distinct, approaching each other; axillæ large, triangular, not conniving; scutellum nearly rhomboidal, of moderate size, abruptly decumbent behind: metathorax including the propodeon short, transverse, rugulose, mostly green: podeon extremely short: abdomen elliptical, subcompressed, smooth, dark blue varied with purple, as long as the thorax; metapodeon pale red, occupying rather more than one-fourth of the dorsum; octoon much shorter than the metapodeon; ennaton much longer? than the octoon; decaton as long? as the octoon; protelum, paratelum and telum short: oviduct a little longer than the abdomen: legs stout, fulvous: wings slightly fuscous; nervures piceous; humerus less than half the length of the wing; ulna more than half the length of the humerus; radius about one-fourth of the length of the ulna; cubitus extremely short, not so long as the radius; stigma of moderate size, emitting a short stout branch that points towards the tip of the radius.